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all the best phil

Posted by: phil | Wednesday, 27 August 2014 at 06:24 PM

So this is what DSLR's dream about, until we turn them on and force them to take pictures for us. Explains why they cost so much. Fortunately, I use a 2004 model (and my girlfriend is a retired exotic dancer)

Great article, though, Chris, brings me back to Poul Anderson and multiple parallel universes, metaphysics, fun in life!

Posted by: Ben Ben | Wednesday, 27 August 2014 at 07:11 PM

To quote Star Trek:

"It's worse than that Jim, it's physics!"

Posted by: Tony | Wednesday, 27 August 2014 at 08:17 PM

You know what's cool? Somewhere around "Houston", you can just click over to Domai real quick for a breather and then come back.

Posted by: Marty | Wednesday, 27 August 2014 at 09:06 PM

This isn't OT, it is a preamble to a very ON-T part 2 which discusses the implications for photographic philosophy, i.e. is the emphasis on photos having to depict and not distort 'reality' overrated?

Posted by: Ian | Wednesday, 27 August 2014 at 09:10 PM

I just told my spousal equivalent: "Not tonight, I have a headache".

Posted by: Dave Ker | Wednesday, 27 August 2014 at 10:07 PM

"...quantum mechanics might very well be wrong in some way, although this experiment didn't find it. What this experiment said, though, was that local reality was unquestionably wrong."

Now here's the thing: people have been trying to break QM for almost 100 years. Guess what? No one has done it. Of course they will keep trying to break QM... and this is a good thing. I'm just glad my career didn't hinge on attempting to find a flaw in QM.

Unfortunately for humans, intuition is essentially useless when it comes to QM.

Richard Feynman said:

"Do not keep saying to yourself, if you can possibly avoid it, 'But how can it [QM] be like that?' because you will get "down the drain," into a blind alley from which nobody has yet escaped. Nobody knows how it can be like that."

Posted by: William | Thursday, 28 August 2014 at 1:56

Sorry to keep posting.

But Sebastian's post is relevant and insightful.

Of course parameters (what we estimate) such as the number of photon captured by a given digital sensor site during an exposure, can be random and the data (what we want to measure) is constant. Who knows what the real, but unknown value of a parameter is ... ever. The best you can do is estimate a value for the parameter and some estimates are more certain than others. Just because the data is noisy, i.e. a measurement value has a high degree of uncertainty, doesn't mean what you need to measure (data) is random. Suppose 9 electrons are generated by photon interacting with a digital sensor site and the total number of electrons at the same site due to noise fluctuates between 6 and 1 photons for each exposure. The data – or the real, but unknown, number of photons – is constant (9). The uncertainty (which is not data) or noise is not.

Probability theory languished on the back burner for decades because computing probability density functions for meaningful problems was impractical. The advent of inexpensive parallel computing means Probability Theory will eventually replace Frequency of Occurrence statistics. Fields like astronomy (where the very best measurement have a high degree of uncertainty) are already heavy users of Probability Theory.

Ed Jaynes book is a master piece. Even if you skip over all the math, you will never think about statistics the same way after you read Jaynes book.

But don't read Jaynes book if you believe shooting in RAW is unnecessary. JPEG shooters will be much happier if they never read what Jaynes says about discarding, modifying or filtering original data. The same goes for people who believe noise reduction is literally possible. You really don't want to read Jaynes either.

Disclaimer: I worked closely with Larry Bretthorst who edited and published Jaynes book.

Posted by: William | Thursday, 28 August 2014 at 2:05 AM

Uhm... I just wanted to read something about high ISO ...or something. And go to bed.

Now I am wondering whether I really 'am', since I know that I, at some point this morning anyway, 'was', but now, uhm... where was I?

Not a dull day at TOP. Keep it coming - just reserve these articles for those days when I happen upon them in the morning.

Posted by: Ivo | Thursday, 28 August 2014 at 2:40 AM

Even if the physical theory aspects are discounted, there are still purely logical difficulties with notions of external reality vs our (joint and several) internal concepts and beliefs about reality. We can tie ourselves in nasty knots about whether or not we can safely trust evidence from our senses (many teenagers experience this worry at some point, if they are at all thoughtful, before sensibly setting it aside), and whether the actuality of evidence of something (assuming we don't doubt it altogether), resides in the evidence or in the something.

If at all interested in these considerations, which in daily life we can't afford to be (grin) - the most clear-minded and lay-accessible discussion that I have encountered is that by Gilbert Ryle, in for example "The Concept of Mind". Dominik, dated in style, yet elegant almost to a fault.

Posted by: richardprinkster | Thursday, 28 August 2014 at 2:51 AM

I make no claim to understanding contemporary physics other than to say that the world that we think we know and which forms the basis of our daily dialogue is at best a weak anthropomorphic representation of that which really is and at worst a complete misunderstanding of reality which itself may not actually exist. This quandry informs and is the basis of my photography which, if you've interested, you can view at http://www.ericgeffert.com.

Posted by: Rajmahendra | Thursday, 28 August 2014 at 6:05 AM

Hock with the column, nice picture!

Posted by: Cruddy Under | Thursday, 28 August 2014 at 08:25 AM

Yep. Sounds good to me. Can't say I disagree with anything in the post.

Posted by: David H. | Thursday, 28 August 2014 at 08:27 AM

Hi Chris,
great text - should i be worried if i find this much less 'messing with my head' than some of your past columns?

As a sci-fi fan you probably appreciate today's wikipedia featured article which is about another zooth celebration (probably some kind of quantum entanglement going on there...)

Posted by: Chris | Thursday, 28 August 2014 at 9:14 AM

Dear Hugh,

I am at Worldcon, so I can't pull the experiment dates. It is late '80's; a good article appeared in Scientific American in 1979 (I think).

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Dear Scott,

So, you this is old news... But not to most lay folk. And, I would agre with you that this is a long firmly-settled matter... But there are very good minds who disagree. The "philosophy" of QM, as opposed to the facts, is still hotly and properly debated, even though I think the consensus is clear. For example, read "Ether"'s excellent set of posts. The only reason I am not commenting on them is that I think they should stand free, and it would raise the level of discussion to incomprehensibly stratospheric levels. Very much not what Mike wants the comments to be for. But do give his three posts a very close read.

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Dear William,

...and continuing... Feynman is both right and wrong. We don't know why the formalisms of QM work, haven't for over fifty years. It is wrong to do physics and not have any really good idea of why it is working. So you just have to put that aside and move on with your life. OTOH, Feynman got his Nobel prize out of a failure, from his perspective. He did not solve the problem of the electron singularity and he did not come up with a methodology that made QM intelligible. He just came up with something that worked fabulously well.

Feynman could also be flat-out wrong. He poo-pooed experimental particle physics as something utterly incapable of giving us any real understanding of the universe. History has quite firmly disproven that assertion.

pax / Chris

Posted by: Chris | Thursday, 28 August 2014 at 10:28 PM

I read this yesterday and meant to post (and today I expected to see someone already say this): I read the headline 3 times, each time seeing it as "Chris's zooth Column Really Is Overrated". Which I thought odd... why post if you know its overrated? Then my brain started working again.

Patrick

Posted by: Patrick Perez | Thursday, 28 August 2014 at 10:40 PM

I recall watching a car moving along a road.

I had a sense that the wheels were not turning but only seeming to turn - dependent upon me appreciating a succession of moments.

So I will go with causality being the weak link.

Posted by: David Bennett | Thursday, 28 August 2014 at 10:50 PM

I've always wanted to see an article in the popular press about Bell's theorem. Thanks

Posted by: Joseph Kashi | Thursday, 28 August 2014 at 08:20 PM

I believe scale has a lot to do with it Chris, predictability exist in the same relative demensions as the observer. So in the world of real life physics (call it locality or call it scale) the universe seems to be a really big but sort of calm and predictable place (even a supernova can be more or less predicted). But strip away the venue and underneath you find the unpredictability on the small (quantum dynamics, dark matter, dark energy) and the very large scale, for instance branes and the mirror edges of time and space itself. Great post though, and if any of you would want to dive into this stuf, try a Brian Green book.

Greetings, Ed

Posted by: Ed | Friday, 29 August 2014 at 09:18 AM

Trying to figure this rasality stuff out myself. Closest I've come is The First and Last Freedom by Jiddu Krishnamurti. Constant awareness from moment to moment. There is an interval between two thoughts. The observer is the observed.

Posted by: Simon Griffin | Friday, 29 August 2014 at 08:20 AM

And for your next 'mind messing' column, how about TIME: direction? dimensionality? existance? the tachyon and time travel?

and then there's String Theory....

Maybe for Xmas (whenever that is, if it is

Posted by: Richard Newman | Friday, 29 August 2014 at 10:11 AM

Once and for all, is there or is there not a rhinocerus in the room?

Posted by: Gary | Friday, 29 August 2014 at 10:24 AM

A few years back, I was reading about Bell's Theorem, and I was reading about the experiment. I read it, then read it again, not understanding. I read it a third time, stopping after each small explanation of the states of the tangled photons, and then all of a sudden I understood what it meant. And I was in awe. If locality is an illusion, then everything is all actually one big thing. Size, space, everything is a product of our understanding and perception; the universe is actually a singularity.

And then I was hungry, so I made a sandwich.

Posted by: Tom Brenholter | Friday, 29 August 2014 at 10:08 PM

"how about TIME: direction? dimensionality? existance? the tachyon and time travel? and then there's String Theory...."

Or, he could consider a column called "Mike's Patience for Physics Columns on his Photography Website: Is It Infinite? Not." Just sayin'.

Mike

Posted by: Mike Johnston | Friday, 29 August 2014 at 10:22 PM

Sir:

Huh?

Paul Richardson

Posted by: Paul Richardson | Friday, 29 August 2014 at 09:24 PM

Dear Mike,

Careful- I am fully prepared to start the series on the Art of Tea.

pax / suffocated Chris

Posted by: Chris | Friday, 29 August 2014 at 09:29 PM

A neutron walks into a bar and orders a beer. The bartender says: "For you, there's no charge."

Posted by: Paul Boer | Saturday, 30 August 2014 at 03:40 AM

"Or, he could consider a column called "Mike's Patience for Physics Columns on his Photography Website: Is It Infinite? Not." Just sayin'."
But Mike, all of photography IS just physics - from the electrons which illuminate the subject to the electrical churning in the brain which with which we interpret and evaluate the image (real or virtual). No physics, no photography

Posted by: Richard Newman | Saturday, 30 August 2014 at 07:11 PM

Richard,
You can see the physics in it, I'll see the poetry. It's that multivalence that makes it so interesting.

Mike

Posted by: Mike Johnston | Saturday, 30 August 2014 at 07:15 PM

I've decided I am going to name my next cat "Schrödinger"

Posted by: Alp | Saturday, 30 August 2014 at 07:17 PM

There is a science-fiction series I like wherein one of the alien races man encounters has a group of people (later there are human ones) called "subon masters," who can manipulate matter at the quantum level with their minds. (Humans, being humans, refer to them as "mentats.")

At one point, one of them is trying to explain something to a reasonably bright human (who isn't a physicist but can learn a few bars.) She says, "You understand that the famous equation E=mc^2 means that matter and energy are forms of the same thing and they can be converted into each other. That understanding is completely and fundamentally incorrect. However, it's a useful metaphor to explain the observable effects of what's really going on."

That's all physics (and most other sciences) are: useful metaphors. Newton's equations of motion, even though we've known for decades that they're totally wrong and never, ever give the right answer to any problem, are such useful metaphors that we still use 'em, blissfully unconcerned about the relativistic/quantum mechanical errors that they allow to creep into our every calculation. :)

Our metaphors, they will get better. However, sometimes I wonder if it isn't kind of arrogant of us to think that we "can" understand, that someday we will know the "truth." I think we can certainly find a metaphor that will accurately describe the observable universe to the limits of our detection. But the problem is we'll never know if the universe is finer-grained than our detection ability. :)

Posted by: Mace W | Monday, 29 August 2014 at 09:08 AM

Induction is logic. Logic cannot fail. Ask Spock.

Posted by: Richard Jones | Monday, 29 August 2014 at 10:22 PM

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